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09/540,955	03/31/2000	George H. BuAbbud	560043610132	1921
7590	06/27/2005		EXAMINER LI, SHI K	
David B Cochran Jones Day Reavis & Pogue North Point 901 Lakeside Avenue Cleveland, OH 44114-1190			ART UNIT 2633	PAPER NUMBER

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 09/540,955  
Filing Date: March 31, 2000  
Appellant(s): BUABBUD ET AL.

**MAILED**

JUN 27 2005

**GROUP 2600**

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Paul E. Franz  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 18 February 2005.

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**(1) *Real Party in Interest***

A statement identifying the real party in interest is contained in the brief.

**(2) *Related Appeals and Interferences***

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

**(3) *Status of Claims***

The statement of the status of the claims contained in the brief is correct.

**(4) *Status of Amendments After Final***

No amendment after final has been filed.

**(5) *Summary of Invention***

The summary of invention contained in the brief is correct.

**(6) *Claims Appealed***

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(7) *Prior Art of Record***

5,459,607	FELLOWS et al.	10-1995
5,491,575	NEIDLINGER et al.	2-1996
5,719,904	KIM	2-1998
5,896,211	WATANABE	4-1999

**(8) *Grounds of Rejection to be Reviewed On Appeal***

The appellant's statement of the grounds of rejection in the brief is correct. The rejection is set forth in a prior Office Action mailed on 11 August 2004.

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**(9) Response to Argument**

The Appellant argues on page 11 of the Brief "Neidlinger teaches that bidirectional communication (NRZ in a first direction, DPSK in the second direction) is to be accomplished by transmitting at a first wavelength of light in the first direction and transmitting at a second wavelength of light in the second direction." However, the phrases underlined by the Appellant are added by the Appellant. Nowhere does Neidlinger teach a first wavelength and a second wavelength. Neidlinger does teach in col. 1, lines 45-49

*the signal transmission proceeding from a decentralized station upstream*

*to the central station can thereby proceed in the same wavelength window.*

Neidlinger admits that such passive optical telecommunication systems are known and points out certain deficiencies of such systems. Neidlinger then states in the "Summary of the Invention" Section improvements added to the known systems, such as using different data code and different carrier frequency in each direction. Neidlinger does not mention any improvement related to optical wavelength.

The Appellant also argues on page 12 of the Brief "Fellows specifically teaches that the data is to be transmitted in both directions using Manchester encoding, and further teaches away from transmitting NRZ data." The Examiner disagrees. It is well known in the art that in frequency division multiplexing, if the frequency spectrum of two channels overlaps, there is interference. Fellows teaches in col. 1, lines 50 "The low frequency components from the high speed data stream will degrade the signal to noise ratio of the low speed data stream and, conversely, the spectrum of the low speed data stream will contribute noise to the high speed data stream." This is illustrated in FIG. 2 of Fellows. When NRZ are used for both upstream

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and downstream traffic, interference occurs due to overlap of frequency spectrum. Fellows teaches in FIG. 2 that spectrum overlap is reduced if Manchester code is used for both upstream and downstream traffic. It is also clear from FIG. 2 that if Manchester code is used for high speed clock and NRZ is used for low speed clock, overlap is further reduced. That is, even through Fellows does not suggest using NRZ for **both** upstream and downstream traffic. Fellows does not teach away from using Manchester for high speed clock channel and NRZ for low speed clock channel. In fact, Fellows teaches that using Manchester for high speed clock channel and NRZ for low speed clock channel has even less spectrum overlap and, therefore, less interference between the two channels.

The Appellant makes on page 12 of the Brief a conclusive statement "Thus, the system in Neidlinger transmits in the upstream direction at a first wavelength and in the downstream direction at a second wavelength." However, nowhere does Neidlinger teach using different wavelengths for upstream and downstream traffic. Neidlinger does teach using WDM for directional separation. This is similar to the use of optical directional coupler 13 in FIG. 1A of Fellows.

The Appellant states in page 14 of the Brief that Neidlinger teach away from claims 3, 7 16 and 21. To support the argument, the Appellant quotes in page 13 of the Brief col. 1, line 62-col. 2, line 6 of Neidlinger and concludes in page 15 of the Brief that "Neidlinger criticizes the prior art teachings of bidirectional, single wavelength baseband transmission systems." The Examiner disagrees. It is true that Neidlinger criticizes the prior art system and it is true that the prior art system uses single wavelength for both upstream and downstream traffic. However, Neidlinger does not criticize **the use of single wavelength**.

It is helpful to understand the improvements that Neidlinger has made to the prior art systems. Neidlinger teaches in col. 1, lines 53-61 that the prior systems use pulsed PSK for downstream and baseband for upstream. This causes synchronization problem because "a burst-like signal is present in the baseband in the upstream direction, special measures for a fast, time-dependent and amplitude-dependent response of the receiver of the central station are required in general". (See col. 1, line 67-col. 2, line 3.) To overcome this problem, Neidlinger reverses the coding scheme and uses PSK for upstream and baseband for downstream (see col. 2, lines 45-67). Furthermore, the PSK modulation uses a carrier frequency derived from the clock frequency of signal received from central station. This "enables a simple clock regeneration or resynchronization given an appropriately selected carrier frequency, and thus makes a fast as well as amplitude-dependent and time-depend response of the receiver of the central station possible." (See col. 2, lines 48-52.) Neidlinger teaches in col. 1, lines 62-66 that prior art systems separate signals of different transmission directions in the electrical part of the receiver. As a consequence, disturbances due to increased shot noise, amplitude noise of the light source and a possible heterodyne effect are not suppressed. To overcome this problem, Neidlinger uses a WDM for directional separation in the optical domain (see col. 3, lines 55-57). Follows uses the same approach and provides optical directional couplers 13 and 14 in FIG. 1A and FIG. 1B, respectively, to achieve a crosstalk suppression of -50 dB. Finally, Neidlinger teaches a scrambled NRZ baseband signal for downstream to assure a reliable clock regeneration in the decentralized station (see col. 2, lines 67-col. 3, line 2). These are all the improvements Neidlinger has made to the prior art systems. Neidlinger never mentions using different wavelengths for upstream and downstream traffic as an improvement. That is, Neidlinger does

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not criticize the use of single wavelength and, therefore, Neidlinger does not teach away from the claimed invention. In re Fulton, 73 USPQ2d 1141 (CA FC 2004).

The Appellant states in page 14 of the Brief that Fellows teach away from claims 3, 7, 16 and 21. The Appellant quotes on page 14 of the Brief col. 1, lines 36-59 and col. 2, lines 26-43 of Fellows to support the argument. The Examiner disagrees. As discussed above, Fellows does not suggest using NRZ for both upstream and downstream traffic. Fellows does not criticize using Manchester for high speed clock channel and NRZ for low speed clock channel. A detailed analysis of Fellows' teaching follows.

Fellows teaches in col. 1 lines 40-45

*However, such duplexing techniques of equal wavelength digital bit streams require the use of optical couplers to separate the optical signal information bits. Optical couplers provide a certain degree of optical isolation but reflections of standard non-return to zero (NRZ) line coded signals at the fiber interface will substantially degrade the detected signal to noise ratio.*

It is understood that even through the downstream and upstream traffic overlap in spectrum, they can be separated because they travel in opposite direction. The problem created by the optical coupler is that it reflects part of the light signal. Of course, the reflection of light by optical coupler occurs regardless of the coding of data carried by the light. The problem is due to the overlap of the spectrum. To solve this problem, Fellows teaches in col. 2 lines 33-39

*Thus the present invention uses a line code, different from the conventional NRZ line codes, that has a power curve that falls away quickly from the desired center or clock frequency. One such suitable code is a bi-phase or Manchester coding that yields a*

*substantial improvement in received signal to noise ratio of both the low speed and high speed channels.*

Fellows then explains in col. 2, lines 39-43 the reason why Manchester code gives better result.

*In the case of the high speed channel, the high-frequency effects of the low speed signals are filtered out with very little degradation of the data waveshape, since there is very little energy in the low frequency region of the Manchester coded optical data stream.*

That is, the high speed channel has little energy in the low frequency region and, therefore, a high pass filter can separate out the high speed channel. For this reason, it is desirable to send high speed channel with Manchester coding. Next, Fellows explains the reason for the better result of the low speed channel.

*In the case of the low speed channel, the noise contribution of the interfering high speed channel is quite low in the bandwidth of the low speed data signal because (i) the energy content is low because energy is falling off rapidly on the low frequency side of the spectrum and (ii) the power spectrum density (PSD) of the high speed channel is low due to the high bit rate, i.e., the energy is spread over a large spectrum. Thus, a small fraction of the total energy in the interfering high speed channel actually contributes to the degradation of the low speed channel signal to noise ratio.*

Again, the improvement is due to the use of Manchester coding for the high speed channel.

After fully analyzing the teaching of Fellows, the Examiner concludes that the improvement that Fellows claims is due to the use of Manchester coding for the **high speed channel**. It is unnecessary to use Manchester coding for low speed channel. In fact, Fellows suggests in FIG. 2 that using Manchester for high speed clock channel and NRZ for low speed



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clock channel has even less spectrum overlap and, therefore, less interference between the two channels. Therefore, Fellows does not teach away the claimed invention. *In re Fulton*, 73 USPQ2d 1141 (CA FC 2004).

The Appellant argues on page 17 of the Brief that there is no motivation to combine the references. The Examiner disagrees. The examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Fellows suggests in FIG. 2 that if NRZ is used for baseband transmission, overlap of upstream and downstream channels is minimized and interference is reduced; Neidlinger teaches in col. 2, line 65-col. 3, line 2 that in downstream direction, a NRZ baseband signal, particular a scrambled NRZ assures a reliable clock regeneration in the decentralized stations. One of ordinary skill in the art would have been motivated to combine the teachings of Neidlinger with the communication system of Fellows because of the advantages taught by the references themselves.

The Appellant argues on page 17 of the Brief that the rejection is based on impermissible hindsight. The Examiner disagrees. It must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's

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disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170

USPQ 209 (CCPA 1971).

Regarding claims 12, 17 and 20, the Appellant argues based on the same reasons, which have been addressed above by the Examiner in regard to claims 3, 7, 16 and 21.

For the above reasons, it is believed that the rejections should be sustained.


Respectfully submitted,

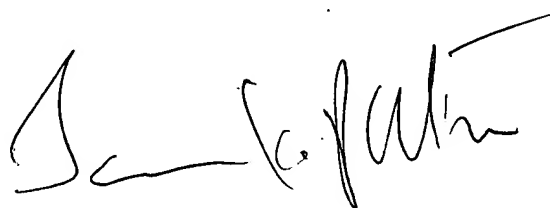
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